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Vos et al.

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(54) **FENESTRATION UNIT REPLACEMENT METHOD AND SYSTEM**

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(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**

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E04D 3/38	(2006.01)
E04D 13/14	(2006.01)
E06B 7/14	(2006.01)
E06B 1/62	(2006.01)

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(52) **U.S. Cl.**

CPC ***E06B 7/14*** (2013.01); *Y10T 29/4973* (2015.01); ***E06B 1/62*** (2013.01); ***E06B 1/68*** (2013.01); *E06B 2001/622* (2013.01); *E06B 2001/628* (2013.01); ***E06B 1/702*** (2013.01)

(58) **Field of Classification Search**

CPC E06B 7/14; E06B 1/62; E06B 1/68; E06B 1/702; E06B 2001/622; E06B 2001/628; Y10T 29/4973

USPC 52/204.1, 209, 204.5, 61, 62

See application file for complete search history.

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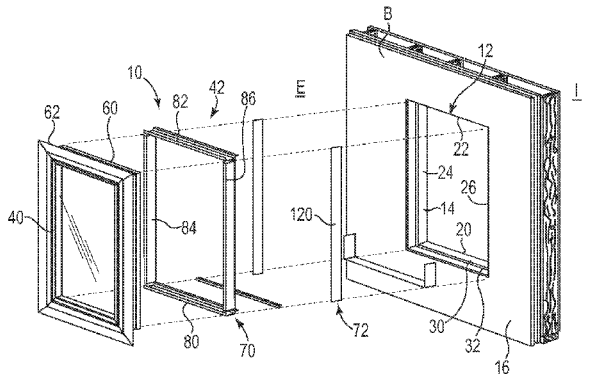
(57) **ABSTRACT**

A water management system installation including framing, a jamb liner, a head liner, and a sill liner. The jamb liner having a cross-section and including a first landing and first and second walls defining an elongated channel, and a second landing extending from the second wall and vertically offset from the first landing, the second landing positioned toward a first jamb member with the first wall disposed toward the exterior side of the building structure. The head liner having a cross-section that is substantially the same as the cross-section of the jamb liner, the second landing of the head liner positioned toward a head member with the first wall disposed toward the exterior side of the building structure. The sill liner having a cross-section and including a first landing positioned toward a sill member with a wall disposed toward the interior side of the building structure.

14 Claims, 10 Drawing Sheets



(51) **Int. Cl.**

E06B 1/68	(2006.01)
E06B 1/70	(2006.01)

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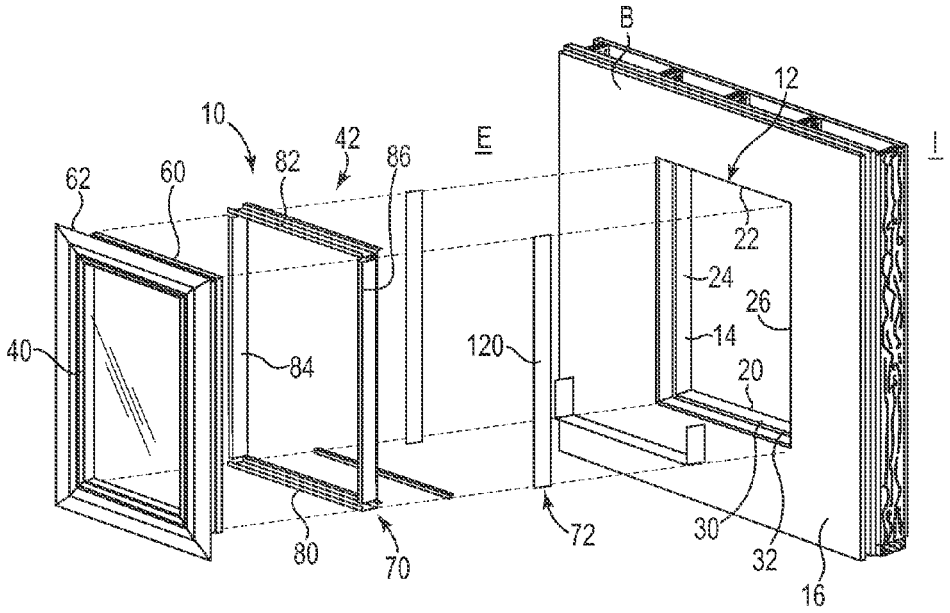

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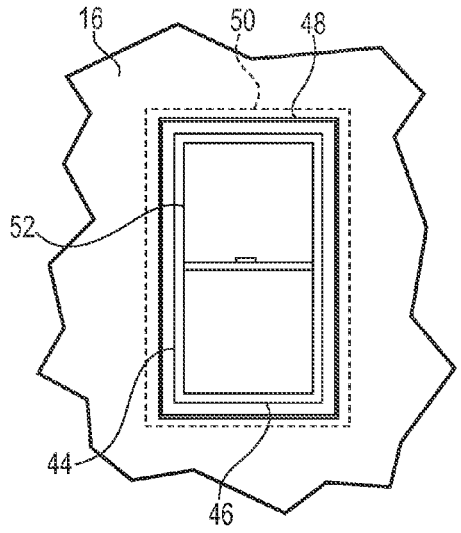

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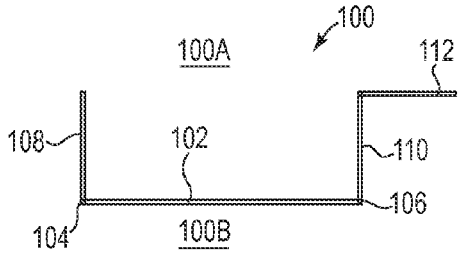

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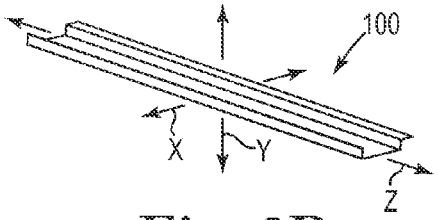

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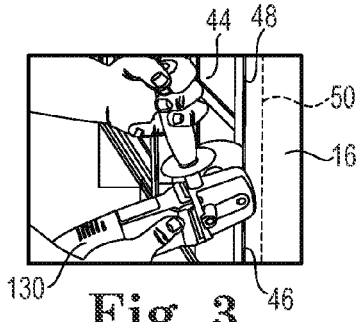

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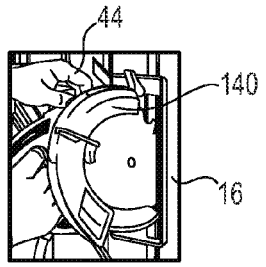

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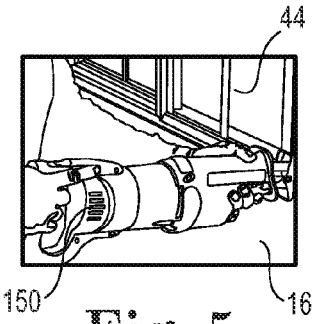

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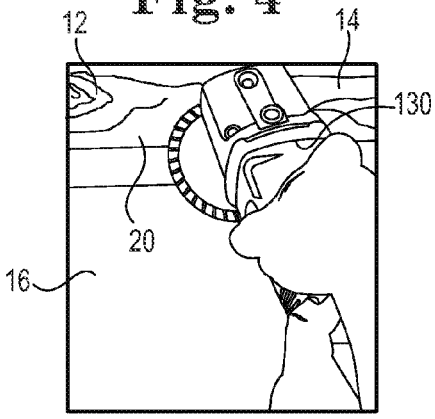

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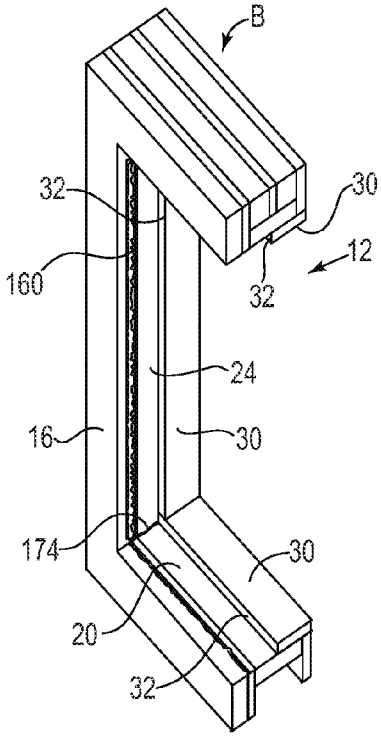

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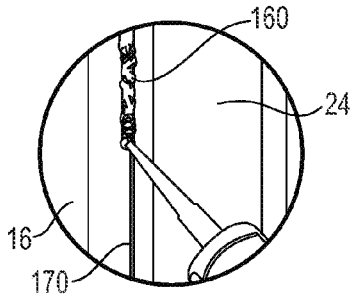

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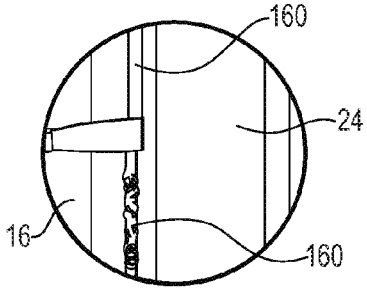

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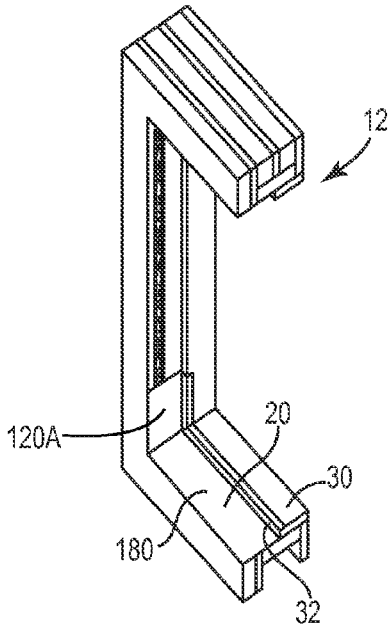

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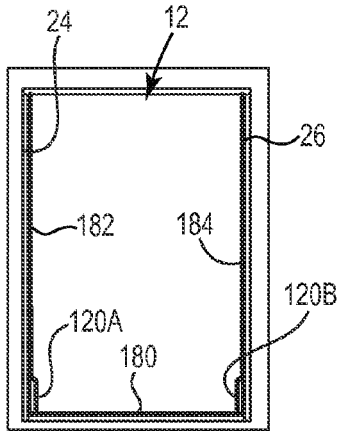

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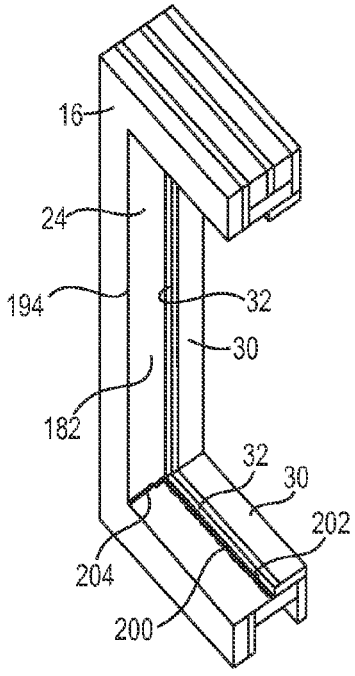

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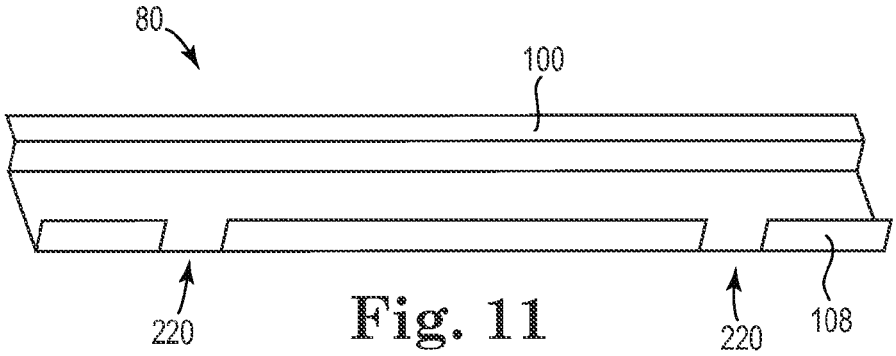

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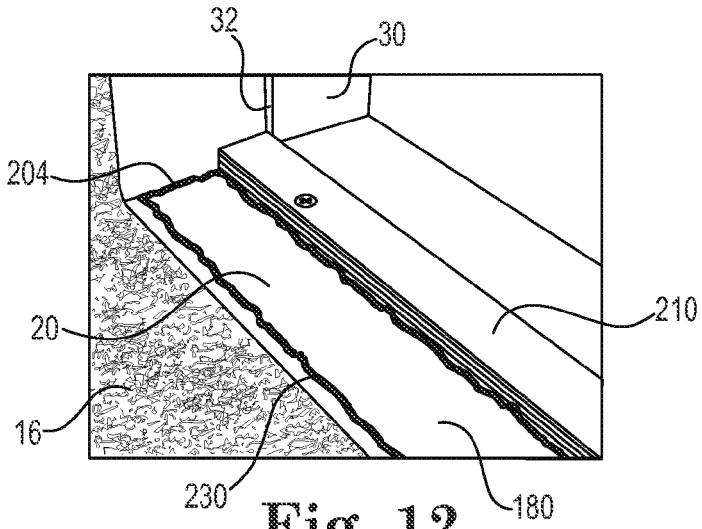

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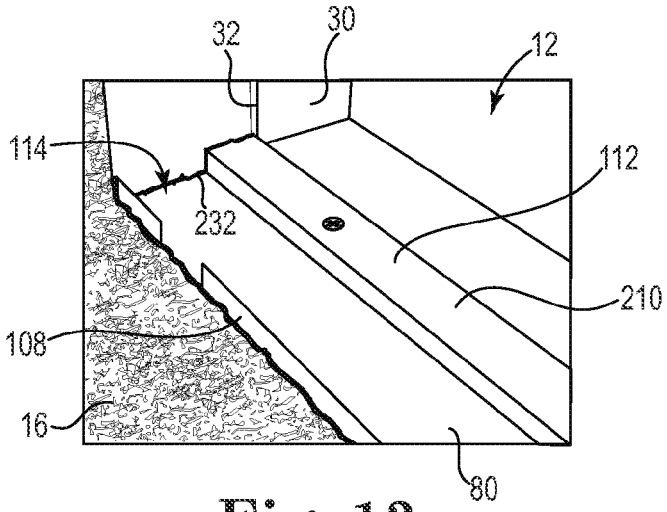

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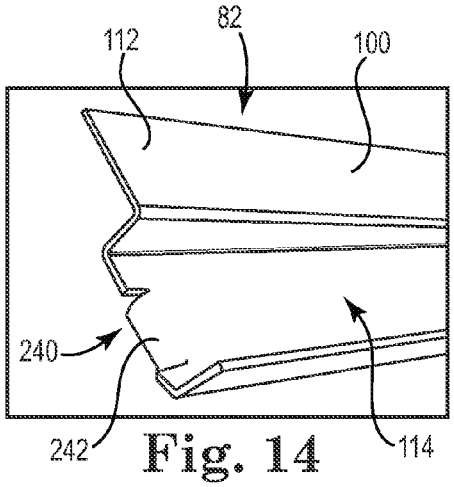

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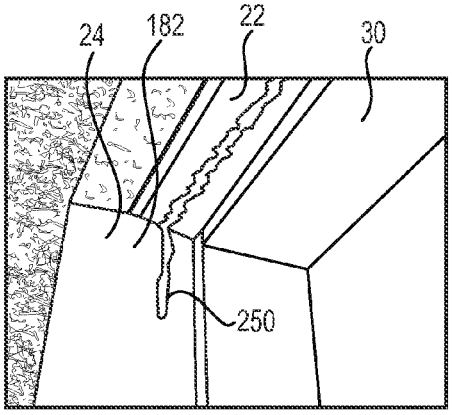

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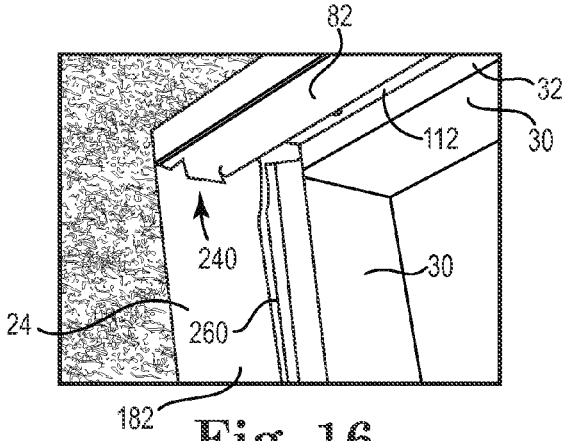

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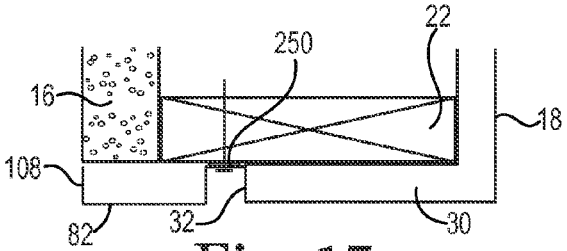

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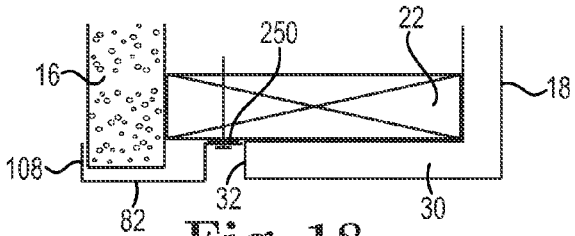

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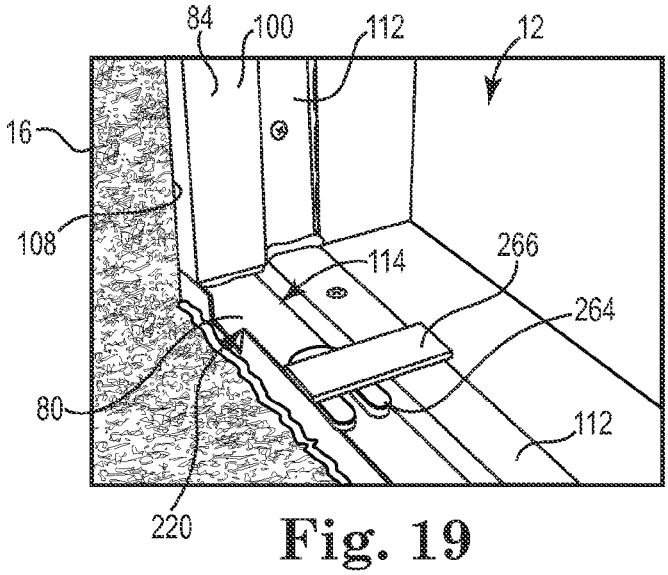
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220

Fig. 19

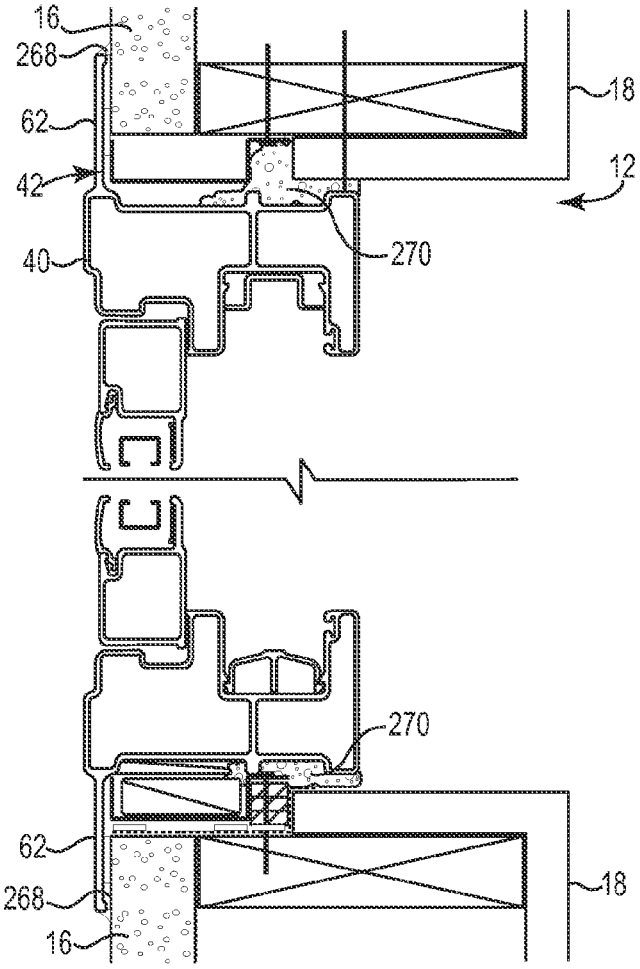
16
268
62
42
40
18
12
270
270
62
268
16
18

Fig. 20

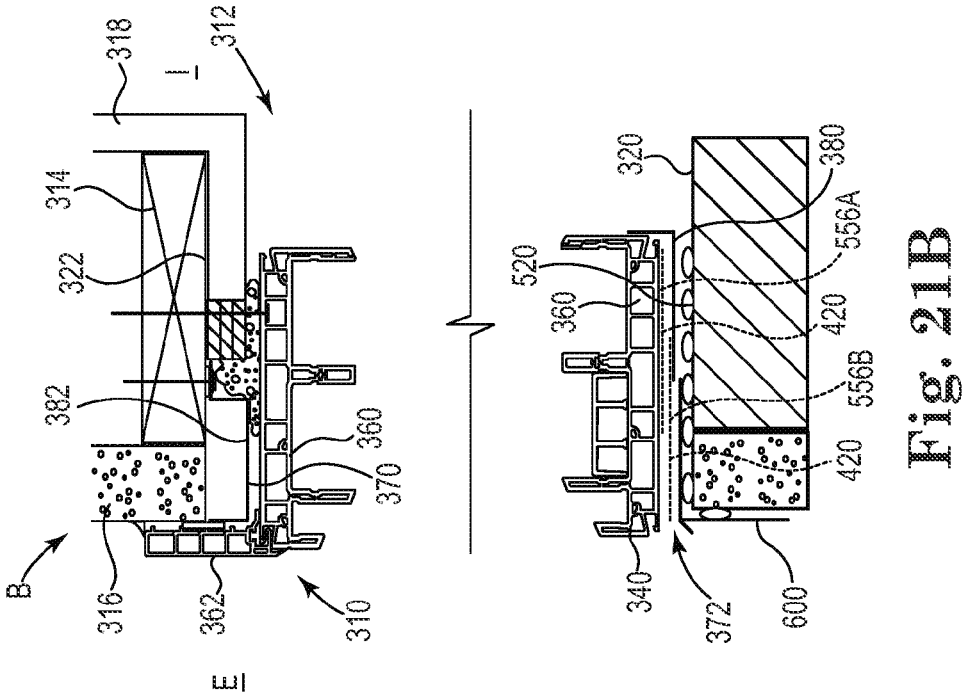

Fig. 21B

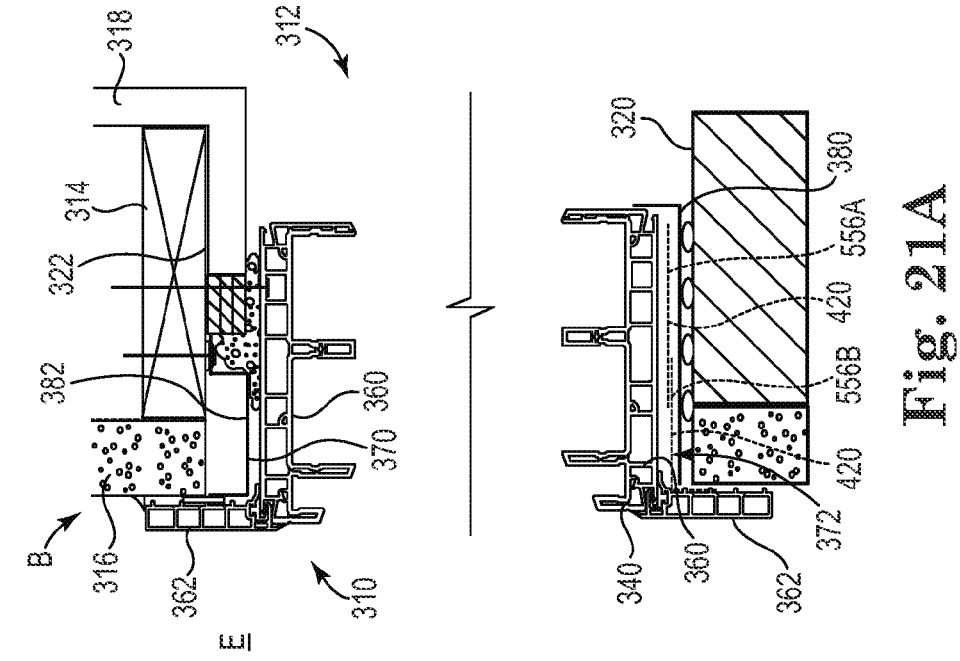

Fig. 21A

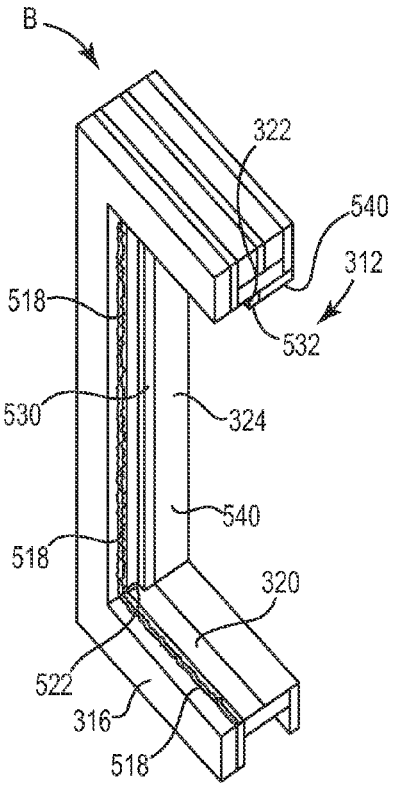

Fig. 22

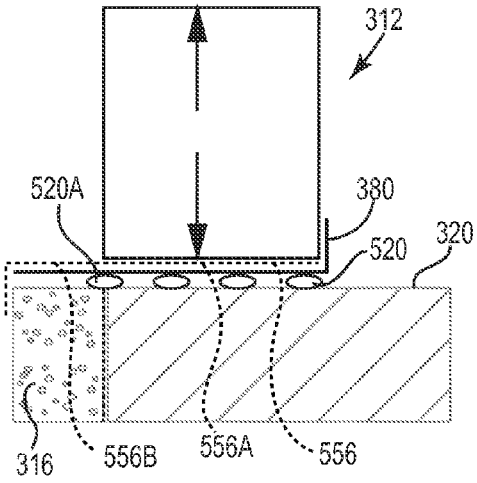

Fig. 24

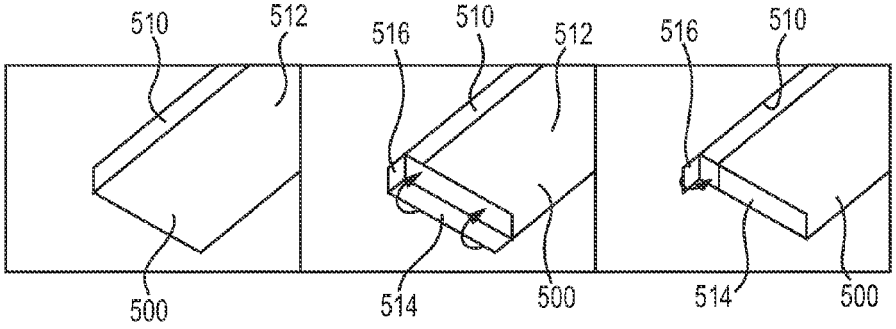

Fig. 23A Fig. 23B Fig. 23C

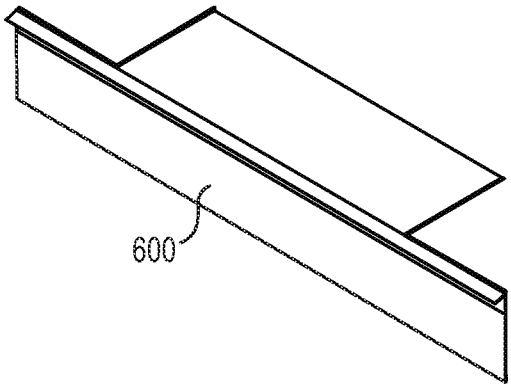

Fig. 25

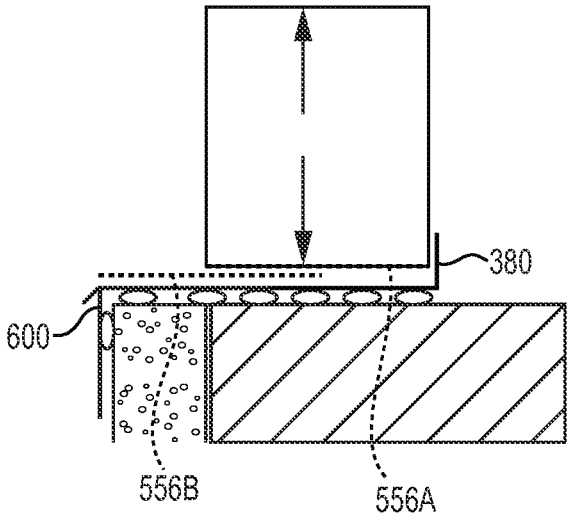

Fig. 26

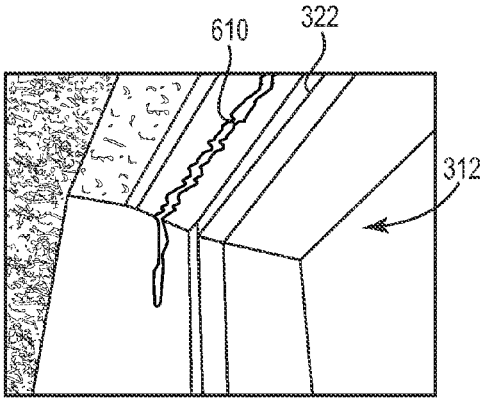

Fig. 27

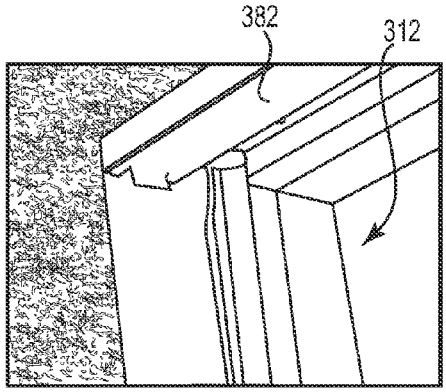

Fig. 28

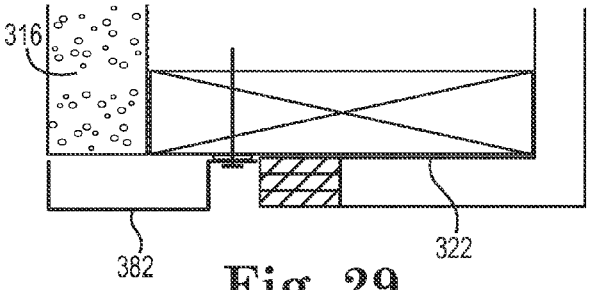

Fig. 29

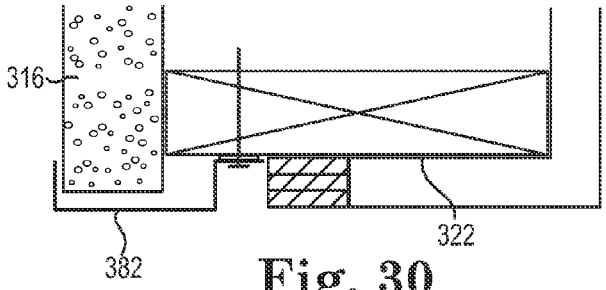

Fig. 30

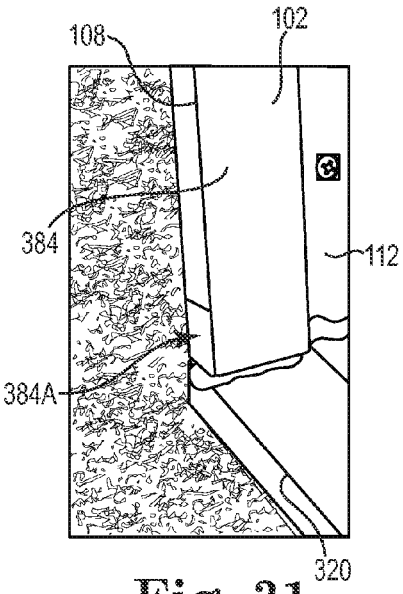

Fig. 31

FENESTRATION UNIT REPLACEMENT METHOD AND SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This application is a Divisional of application Ser. No. 13/014,542, filed Jan. 26, 2011, which is herein incorporated by reference in its entirety.

BACKGROUND

Prior methods of replacing windows and other fenestration units in an existing structure, especially stucco covered structures, have included utilizing a flush flange window design, also described as a pocket replacement, where the frame of the pre-existing window is left in place while the sashes are removed from the pre-existing window assembly. The new window is then inserted from the exterior of the building and centered in the prepared opening, including the pre-existing window frame. The window flange is secured tight against the window frame, an exterior seal is created by sealing the flange to the stucco with sealant placed on the flanges of the new window, and an interior seal is created by sealing the window frame to the existing window assembly. A second, more involved methodology is also used where the exterior stucco is chipped away to reveal the pre-existing window frame and nailing fin and the entire pre-existing window assembly is removed prior installation of the new window assembly. Similarly methodology is employed with other types of fenestration units, such as pre-hung door assemblies. Improvements remain to be made over either method, where leaving the pre-existing frame in the rough opening can be problematic from aesthetic and weatherability standpoints and removal and replacement of the stucco surface is labor intensive.

SUMMARY

Some embodiments relate to an replacement installation that is provided, in some implementations, by cutting around the pre-existing fenestration unit, removing the pre-existing fenestration unit, installing a water management system, and installing the replacement fenestration unit, the methodology thereby helping to minimize damage to a finished exterior surface of the structure in which the replacement fenestration unit is being installed and accomplishing a more efficient and effective means for installing a replacement fenestration unit while maintaining water integrity of the structure.

Some embodiments relate to a method of replacing an existing fenestration unit secured in a rough opening in a wall having a finished exterior. The method includes releasing an existing fenestration unit from the wall by cutting around the existing fenestration unit, including cutting into the finished exterior of the wall and through a perimeter portion of the existing fenestration unit to release the fenestration unit from the wall. The method also includes removing the existing fenestration unit from the rough opening in the wall, installing a water management system along a sill of the rough opening, and inserting a new fenestration unit into the rough opening. The new fenestration unit is secured in the rough opening.

Some embodiments relate to a method of preparing a water management system for installation in a rough opening. The method includes cutting a sill liner of a desired length from a segment of material, the segment material being pre-formed with a first base extending between a first end and a second end, a first flange extending from the first end of the first base and a second flange extending from the second end of the first base, the segment of material defining an elongate channel between the first and second flanges, and a second base extending from the second flange, the first and second bases being vertically offset from one another. The method also includes forming a drainage port into the first flange of the sill liner and cutting a jamb liner of a desired length from a piece of the blank material.

Some embodiments relate to a water management system installation. The installation includes framing including a first jamb member, a second jamb member, a head member, and a sill member, the first and second jamb members, the head member, and the sill member defining a rough opening in a building structure having an exterior side and an interior side. The installation also includes a first jamb liner having a cross-section and including a first landing extending between a first end and a second end, a first wall extending from the first end of the first landing and a second wall extending from the second end of the first landing, the blank material defining an elongate channel between the first and second walls, and a second landing extending from the second wall, the first and second landings being vertically offset from one another, the second landing being positioned toward the first jamb member with the first wall disposed toward the exterior side of the building structure. The installation also includes a head liner having a cross-section that is substantially the same as the cross-section of the jamb liner, the head liner including a first landing extending between a first end and a second end, a first wall extending from the first end of the first landing and a second wall extending from the second end of the first landing, the blank material defining an elongate channel between the first and second walls, and a second landing extending from the second wall, the first and second landings being vertically offset from one another, the second landing being positioned toward the head member with the first wall disposed toward the exterior side of the building structure.

While multiple embodiments are disclosed, still other embodiments of the present invention will become apparent to those skilled in the art from the following detailed description, which shows and describes illustrative embodiments of the invention. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**A shows selected portions of a replacement installation for a rough opening in a building, according to some embodiments.

FIG. **1**B shows a pre-existing fenestration unit in the rough opening.

FIGS. **2**A and **2**B show a segment of liner material of the water management system of FIG. **1**A, according to some embodiments.

FIGS. **3-6** are illustrative of a method of removing the pre-existing fenestration unit from the rough opening, according to some embodiments.

FIGS. **7-10** show the rough opening during various stages of preparation for installation of a replacement fenestration unit in the rough opening, according to some embodiments.

FIGS. **11-13** are illustrative of a sill liner of the replacement installation of FIG. **1**A, as well as preparation of the rough opening and installation of the sill liner in the rough opening, according to some embodiments.

FIGS. **14-18** are illustrative of a head liner of the replacement installation of FIG. **1**A, as well as preparation of the

rough opening and installation of the head liner in the rough opening, according to some embodiments.

FIG. **19** shows spacers installed on the sill liner, according to some embodiments.

FIG. **20** shows a replacement fenestration unit installed in the rough opening, according to some embodiments.

FIGS. **21**A-**31** are illustrative of another replacement installation, according to some embodiments.

While the invention is amenable to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and are described in detail below. The intention, however, is not to limit the invention to the particular embodiments described. On the contrary, the invention is intended to cover all modifications, equivalents, and alternatives falling within the scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION

Some embodiments relate, in part, to a replacement installation for a pre-existing fenestration unit in a finished exterior structure. The replacement installation is provided, in some implementations, by cutting around the pre-existing fenestration unit and installing a water management system, thereby minimizing damage to the finished exterior surface and accomplishing a more efficient and effective means for installing a replacement fenestration unit. Although some features and advantages are described accordingly, additional and alternate features and advantages are to be understood with reference to the description and drawings.

FIG. **1**A shows a replacement installation **10** for a rough opening **12** in a building structure B formed by a substructure **14** (also described as a framing) defining the rough opening **12**, a finished exterior **16** on an exterior side E of the building B, and a finished interior **18** (FIG. **20**) on an interior side I of the building B, according to some embodiments. As shown, the substructure **14** defines various portions of the rough opening **12**, including a sill **20**, a head **22** opposite the sill **20**, a first jamb **24**, and a second jamb **26** opposite the first jamb **24**. In some embodiments, the finished exterior **16** is a stucco finish (e.g., including a weather barrier, metal lath, one or more plaster layers, and/or other materials), though alternate or additional finished exteriors are contemplated (e.g., brick, tile, or other finished surfaces). The interior **18** optionally includes a layer of drywall and/or other materials (e.g., vapor barrier material). A drywall return **30** (or other material) defining an exterior edge **32** is optionally secured to the sill **20**, head **22**, and jambs **24**, **26** as desired.

As shown in FIG. **1**A, the replacement installation **10** includes a fenestration unit **40** and a water management system **42**. In some embodiments, the replacement installation **10** is provided as part of a method of replacing a pre-existing fenestration unit **44** (FIG. **1**B) previously installed in the rough opening **12** of the substructure **14**.

As shown in FIG. **1**B, in some embodiments, the pre-existing fenestration unit **44** includes a frame **46** defining an outer perimeter **48**, a nailing fin **50** projecting beyond the outer perimeter **48** of the frame, and a sash assembly **52**. The nailing fin **50** is secured to the substructure **14** (FIG. **1**A) with portions of the finished exterior **16** extending over the nailing fin **50** and adjacent the outer perimeter **48** of the frame **46**. In other words, in some embodiments, the pre-existing fenestration unit **44** is first installed to the substructure **14** with the finished exterior **16** subsequently applied over both the substructure **14** and portions of the pre-existing fenestration unit **44**, such as the nailing fin **50**.

The fenestration unit **40** is optionally a window unit or a door unit, for example. As shown in FIG. **1**, the fenestration unit **40** is a window insert having a frame **60** and a flange **62**. During installation, the frame **60** is received in the rough opening **12** with the flange **62** adapted to abut or reside adjacent portions of the finished exterior **16** and/or substructure **14**, for example. Similarly, although in some embodiments, the pre-existing fenestration unit **44** is a window assembly (e.g., a double hung window with a nailing fin), the pre-existing fenestration unit **44** is optionally a different type of window or a different type of fenestration unit, such as a pre-hung door.

The water management system **42** includes a liner system **70** and a barrier system **72**. The liner system **70** includes a sill liner **80**, a head liner **82**, a first jamb liner **84**, and a second jamb liner **86**. In some embodiments, the liners **80**, **82**, **84**, **86** are each formed during installation from substantially the same preformed liner material (though not necessarily the same piece of liner material), where a segment of the liner material **100** is shown in FIGS. **2**A and **2**B, where FIG. **2**A is an end view and FIG. **2**B is a perspective view. In other words, in some embodiments, two or more of the liners **80**, **82**, **84**, **86** are formed during installation from a single piece of liner material, though utilization of pre-separated pieces of liner material for each of the liners **80**, **82**, **84**, **86** is contemplated. The liner material is optionally metallic (e.g., aluminum) or polymeric (e.g., polypropylene), or other type of material, depending upon implementation.

As shown in FIGS. **2**A and **2**B, the liner material **100** defines a length along a longitudinal axis Z, a width along an installation axis X, and depth along a support axis Y, as well as a first side **100**A and a second side **100**B on opposite sides of a transverse cross-section of the liner material **100**. The liner material **100** includes a first base **102**, also described as a landing, having a first end **104** and a second end **106**, a first flange **108**, also described as a wall, extending substantially perpendicular from the first end **104** of the first base **102**, a second flange **110**, also described as a wall, extending substantially perpendicular from the second end **106** of the first base **102**, and a second base **112**, also described as a landing, extending substantially perpendicular from the first base **102**. The first and second flanges **108**, **110** and the first base **102** define a channel **114** for conveying moisture, as subsequently described. As shown, the first and second bases **102**, **112** are substantially planar and parallel to one another, one offset from the other (i.e., not coplanar, though parallel). In turn, the first and second flanges **108**, **110** are also substantially planar and parallel to one another, one offset from the other (i.e., not coplanar, though parallel). The first and second flanges **108**, **110** are positioned opposed to one another, where the first and second bases **102**, **112** are offset from one another. As shown, the first and second bases **102**, **112** define different widths, the first base **102** being substantially wider (e.g., about 1.5 inches wide) than the second base **112** (e.g., about 0.5 inches wide). In turn, the first and second flanges **108**, **110** define substantially the same depth (e.g., about 0.5 inches each).

As shown in FIG. **1**A, the barrier system **72** includes flashing **120** to help reduce the potential for water ingress into the interior side I of the building B. The flashing **120** is optionally flashing tape, such as butyl flashing tape sold under the trade name "SMARTFLASH," by Pella Corporation of Pella, Iowa. The barrier system **72** also optionally includes various sealant layers, optionally applied as a liquid by the installer, as described in greater detail below.

Some examples of methods of removing the pre-existing fenestration unit **44**, preparing the rough opening **12**, and installing the fenestration unit **40** follow. In some fenestration

unit replacement and installation methods, the fenestration unit **40** is removed from associated packaging, inspected, and measured to confirm the fenestration unit **40** will fit into the rough opening **12** prior to removing the pre-existing fenestration unit **44** from the rough opening **12**. In some embodiments, the fenestration unit **40** is preferably determined to be a minimum of 0.5 inch smaller in width and height than a pre-existing interior drywall return **30**, or 1.5 inches smaller in width and height than the rough opening **12**.

FIGS. **3** to **5** illustrate a manner of removing the pre-existing fenestration unit **44** according to some embodiments. The pre-existing fenestration unit **44** is optionally removed by cutting through the nailing fin **50** using an appropriate cutting implement, and also cutting through the finished exterior **16** where the finished exterior **16** sufficiently overlaps the nailing fin **50**. The installer cuts about the outer perimeter **48** of the pre-existing fenestration unit **44**, on all sides of the fenestration unit **44** in order to release the pre-existing fenestration unit **44** from the rough opening **12**. In some embodiments, the installer uses the frame **46** as a rough guide, abutting the cutting implement against the outer perimeter **48** of the frame **46** or otherwise following the outer perimeter **48** to cut around the pre-existing fenestration unit **44**. As shown in FIG. **3**, in some embodiments, an angle grinder **130** is used with a diamond abrasive wheel to cut through the finished exterior **16** (e.g., stucco). After the finished exterior **16** is cut, as shown in FIG. **4**, a circular saw **140** is optionally used through the cut in the finished exterior **16** to cut to a desired depth through the nailing fin **50** (FIG. **1**B) of the pre-existing fenestration unit **44**. Finally, as shown in FIG. **5**, a reciprocating saw **150** is optionally used to connect and/or finish the cuts through the finished exterior **16** and/or nailing fin **50** (FIG. **1**B) about the perimeter at the corners, helping to ensure a clean (e.g., less ragged, more uniform) cut about the rough opening **12** (FIG. **1**A). If desired, a vacuum (not shown) with a HEPA filter is used during various cutting steps to minimize dust (e.g., generated using the angle grinder, circular saw, etc.).

Once the nailing fin **50** has been cut and/or other fastening means (such as screws) have been cut from around the pre-existing fenestration unit **44**, the pre-existing fenestration unit **44** is released from the rough opening **12** and can be removed and disposed of properly. Note, in some embodiments, the nailing fin **50** remains embedded under the finished exterior **16** following removal of the pre-existing fenestration unit **44**. In at least this manner, various embodiments help avoid removing surrounding portions of the finished exterior **16** that would otherwise need to be removed (and subsequently repaired) in order to access the nailing fin **50**. After removing the pre-existing fenestration unit **44**, the rough opening **12** is cleaned and any rotted or damaged portions of the substructure **14** are repaired or replaced as desired. If present, any house wrap or other barrier material is trimmed flush with the exterior of the rough opening **12** or as desired.

In some embodiments, the finished exterior **16** is repaired (e.g., stucco is patched) if there is any collateral damage while removing the pre-existing fenestration unit **44** (e.g., if the reciprocating saw caught on the wire lath in a stucco application causing damage to the stucco finish). As shown in FIG. **6**, in some embodiments, the sill **20** and jambs **24**, **26** of the rough opening **12** are prepared by cutting the finished exterior **16** along the sill **20** and jambs **24**, **26** as necessary to help ensure the finished exterior **16** does not project beyond the substructure **14** (above the sill **20** and inward of the jambs **24**, **26**). In other words, the finished exterior **16** is generally cut flush with the substructure **14**. The substructure **14** is cleaned (e.g., all dust and debris is vacuumed and the sill framing is wiped with isopropyl alcohol, a window cleaner, or other cleanser as desired). The head **22** is optionally similarly prepared, with the finished exterior **16** being cut flush to the substructure **14** and cleaned as desired.

FIG. **7** is a cross-section of a selected portion of the building B, showing about half of the rough opening **12**. In some embodiments, the rough opening **12** is prepared for installation of the fenestration unit **40** by applying the liner system **70** and the barrier system **72** (FIG. **1**A). As shown in FIGS. **7** and **7**A, some methods of preparing the rough opening **12** at the sill **20** include applying a perimeter sealant **160** (e.g., an approximately 0.375 inch wide bead of sealant) between the finished exterior **16** and the rough opening **12** at the jambs **24**, **26** and the sill **20**. In particular, in some embodiments, there is a space **170** or gap between the finished exterior **16** and the substructure **14** (e.g., where the finished exterior **16** is a stucco finish) that is exposed upon cutting the pre-existing fenestration unit **44** free from the rough opening **12**. In some embodiments, sealant is not applied in the gap or space at the head **22**. As shown in FIG. **7**B, the perimeter sealant **160** is optionally tooled into the space **170** between the finished exterior **16** and the rough opening **12** (e.g., with a putty knife or other implement, such as a scrap shim) as desired to press the perimeter sealant **160** into the space **170**. As shown in FIG. **7**, in some embodiments, a corner sealant **174** (e.g., an approximately 0.375 inches wide bead of sealant) is placed at each corner of the rough opening **12**, with the corner sealant **174** extending from the finished exterior **16** to the exterior edge **32** of the drywall return **30** or to the interior edge of the substructure **14** (one of the corners at the sill **20** is shown with the corner sealant **174** applied up to the drywall return **28** in FIG. **7**).

As indicated in FIGS. **8** and **10**, in some embodiments, the flashing **120** (FIG. **1**A) includes a sill flashing **180** a first jamb flashing **182**, and a second jamb flashing **184**. As indicated in FIGS. **8** and **10**, the sill flashing **180**, or bottom flashing, is applied to the sill **20** of the rough opening **12**. For example, the sill flashing **180** is optionally formed from a strip of flashing tape such as that previously described that is cut longer than the width of the rough opening **12** (e.g., approximately 12" longer) to define excess tape ends **120**A, **120**B, where the excess tape ends **120**A, **120**B are applied up the first and second jambs **24**, **26** (e.g., approximately 6" of excess flashing extending up the first and second jambs **24**, **26**). An exterior edge **190** of the sill flashing **180** is applied along the edge of the finished exterior **16**, with the sill flashing **180** being pressed down firmly over the perimeter and corner sealant **174**, the exposed substructure **14** at the sill **20** and the jambs **24**, **26**, the exterior edge **32** of drywall return **30**, and onto the exposed surface of the drywall return **30**.

The first and second jamb flashings **182**, **184** are optionally formed by cutting two pieces of flashing tape approximately equal to the height of the rough opening **12**. As indicated in FIGS. **9** and **10**, exterior edges of the jamb flashings **180**, **182** (exterior edge **194** of first jamb flashing **182** is shown in FIG. **9**) are placed along the edge of the finished exterior **16** along the first and second jambs **24**, **26**. The jamb flashings **182**, **184** are pressed down firmly over the sealant perimeter sealant, the exposed substructure **14** at the jambs **24**, **26**, the exterior edge **32** of drywall return **30**, and onto the exposed surface of the drywall return **30**.

As indicated in FIG. **9**, a sill sealant **200** (e.g., an approximately 0.375 inches bead of sealant), including a first portion **202** applied across the sill **20** on top of the sill flashing **180**, against the exterior edge **32** of the drywall return **30**, corner portions **204** applied at the corners of the rough opening **12** where the sill **20** meets the first and second jambs **24**, **26** (only the corner portion **204** at the first jamb **24** is shown in FIG. **9**).

As appropriate, a filler strip **210** is cut to a desired length and width and installed at the sill **20**. For example, a wood or expanded PVC filler strip **210** is optionally produced by measuring from the exterior face of the finished exterior **16** to the exterior edge **32** of the drywall return **30** and by subtracting approximately 1.625 inches to determine an appropriate width for the filler strip **210**. The filler strip **210** is approximately 0.5 inches thick and is cut to the same length as the sill **20** at the determined width. The filler strip **210** is installed on top of the sill sealant **200** (FIG. **9**) applied on top of the sill flashing **180**. The filler strip **210** is optionally attached to the sill **20** with fastening means, such as #8×1.5 inch flat head wood screws, where the screws are placed approximately 6" from the ends of the filler strip **210** and a maximum of approximately 16" apart on center.

The sill liner **80** is shown in perspective in FIG. **11**, according to some embodiments. The sill liner **80** is optionally prepared by cutting the liner material **100** to a length that is approximately the width of the rough opening **12**. In some embodiments, a single, continuous length of liner material **100** is utilized to form the sill liner **80** (rather than splicing multiple lengths of the liner material **100**, for example), to help ensure integrity of the water resistance of the sill liner **80**. A plurality of drainage ports **220** (e.g., two as shown in FIG. **11**) are cut into the sill liner **80** as desired. For example, in some embodiments a 1" wide drainage port **220** is cut into the first flange **108** of the sill liner **80** approximately 2" from each end of the sill liner **80**. For each port **220**, snips are optionally used to make two cuts in the face of the sill liner **80** and then pliers are used to bend the resulting tab, thereby breaking off the tab to form the respective drainage port **220**.

As part of installing the sill liner **80**, in some embodiments, a secondary sealant **230** is applied as shown in FIG. **12** (e.g., two bead lines of 0.375 inch sealant) across the sill **20** (and in particular, on top of the sill flashing **180**) joining the first and second side portions of the sill sealant **200** located at the ends of each of the first and second jambs **24**, **26**.

As shown in FIG. **13**, the sill liner **80** is installed over the secondary sealant **230** (FIG. **12**) and attached to the sill **20** as desired (e.g., using 1.25" self drilling screws through the second base **112** into the filler strip **210** (FIG. **12**) and disposed a maximum of 6" from each end and 12" from one another on center). The sill liner **80** is positioned with the first flange **108** flush with the exterior surface of the finished exterior **16** and the second base **112** over the filler strip **210**, such that the channel **114** is facing upward toward the center of the rough opening **12**. In some embodiments, a liner sealant **232** (e.g., an approximately 0.375 inch bead) to each end of the sill liner **80** to seal the sill liner **80** to the jambs **24**, **26** and sill **20**. Any gaps along the exterior joint between the sill liner **80** and the finished exterior **16** are filled with sealant as desired (e.g., including tooling sealant into any such gaps as desired).

An end portion of the head liner **82** is shown in perspective in FIG. **14**, according to some embodiments. The head liner **82** is optionally prepared by cutting the liner material **100** to a length that is approximately the width of the rough opening **12**. In some embodiments, a single, continuous length of the liner material **100** is utilized to form the head liner **82** (rather than splicing multiple lengths of material, for example), to help ensure integrity of the water resistance of the head liner **82**. Connection ports **240** are formed at each end of the head liner **82**, where one of the connection ports **240** is shown in FIG. **14**. In some embodiments, the connection ports **240** are formed by cutting a 0.25 inch deep by 0.75 inch wide tab **242** into the first base **102** at each end of the head liner **82** (e.g., using snips) and bending the tab **242** downwardly to form the particular connection port **240**.

As shown in FIG. **15**, in some embodiments, a head sealant **250** is applied across the head **22** of the rough opening **12**, in front of the drywall return **30**, and down onto the upper portions of the first and second jambs **24**, **26** (and in particular, onto the first and second jamb flashings **182**, **184**). For example, an approximately 0.375 wide bead of sealant is optionally applied across the head **22** of the rough opening **12** and down approximately 1 inch onto the jambs **24**, **26** prior to installing the head liner **82**. As shown in FIG. **16**, the head liner **82** is installed over the head sealant **250** with the channel **114** (FIG. **14**) facing away from the center of the rough opening **12**, toward the head **22** and the second base **112** against the head and head sealant **250**. The head liner **82** is attached to the head **22** (e.g., using screws or other fastening means through the second base **112** as previously described). In some embodiments, each end of the head liner **82** is sealed to the jambs **24**, **26** (e.g., by running sealant around the ends of the head liner **82**) while leaving the area around the tabs **242** on the head liner **82**, and in particular the connection ports **240**, unsealed. The head liner **82** is optionally installed with the first flange **108** flush with the finished exterior **16** (e.g., as shown in FIG. **17**) similarly to the sill liner **80**. In other embodiments the head liner **82** projects beyond the edge of the finished exterior **16** and is overlapped onto the exterior face of the finished exterior **16** (e.g., where the stucco is not flush with the rough opening, e.g., as shown in FIG. **18**).

In some embodiments, the first and second jamb liners **84**, **86** are cut from the liner material **100** to approximately 1" less than the height of the rough opening **12**. As shown in FIG. **16**, a jamb sealant **260** is applied to the first jamb **24** (and in particular, to the first jamb flashing **182**), as well as the second jamb **26** (and in particular, the second jamb flashing **184**, though not shown in FIG. **16**), where application of the jamb sealant **260** optionally includes applying an approximately 0.375 inch bead of sealant down each of the jambs **24**, **26** in front of the drywall return **30**.

As indicated in FIG. **19**, the first jamb liner **84** is positioned on the first jamb **24** with the first flange **108** flush to the finished exterior **16** and the channel **114** facing toward the first jamb **24** such that the channel **114** of the first jamb liner **84** is aligned with a corresponding one of the connection ports **240** of the head liner **82**, as well as with the channel **114** of the sill liner **80**. The second jamb liner **86** is similarly positioned on the second jamb **26**. The first and second jamb liners **84**, **86** are attached to the first and second jambs **24**, **26**, respectively (e.g., using 1.25 inch self-drilling screws through the second base **112** and placed approximately 6" from each end and 12" on center from one another).

In some embodiments, the jamb liners **84**, **86** are sealed at the interior corners where the bottom of the respective one of the jamb liners **84**, **86** meets the sill liner **80**. In other words, additional sealant is optionally applied at the corners of the rough opening **12**, where the second base portions **112** of the jamb liners **84**, **86** and the sill liner **80** meet (e.g., FIG. **19** shows sealant at the corner between the base portions **112** of the first jamb liner **84** and the sill liner **80**). If the head liner **82** or jamb liners **84**, **86** include splices (i.e., multiple, discontinuous portions of the liner material **100**) additional flashing **120** is optionally over the splices to help ensure water integrity.

During and at the end of installation, the installer periodically inspects the installation to verify that water will be able to travel from the channel **114** of the head liner **82**, into the channel **114** of the jamb liners **84**, **86**, down into the channel **114** of the sill liner **80**, and exit from the drainage ports **220**.

As shown in FIG. **19**, in some embodiments, spacers are positioned on the sill liner **80** as a part of the installation process. For example, one or more liner spacers **264** (e.g., 0.5 inch impervious spacers) are installed in the channel **114** of the sill liner **80** (e.g., approximately 1" from each side). The liner spacers **264** are positioned to allow water flowing down the jamb liners **84**, **86** to flow to, and out of, the drainage ports **220**. If desired, support spacers **266** (e.g., 1 inch×0.25 inch spacers) are placed on top of the liner spacers **264**. Support spacers and/or shims may also be implemented at points where multiple fenestration units are joined together (not shown). Shims are added as desired to help ensure the spacers are level, where the shims are trimmed to help ensure a continuous interior seal when completing the installation.

As shown in FIG. **20**, with the water management system **42** installed, the fenestration unit **40** is inserted into the prepared rough opening **12** (e.g., with the frame **60** positioned in the rough opening **12** and the flange **62** adjacent the finished exterior **16**). The fenestration unit **40** is optionally secured to the rough opening **12** using the manufacturer's recommendations and/or traditional window insert installation methods, including application of fenestration unit sealant **268** and insulating foam **270** about the perimeter of the fenestration unit **40** as shown in FIG. **20**, for example.

While FIGS. **1-20** generally illustrate installation of a window assembly, according to some embodiments, it should be understood that other fenestration unit installations, door assembly installations, for example, are also contemplated. For example, FIGS. **21A-31** are illustrative of door installation methodology for a replacement installation **310** in a rough opening **312** in a building structure B formed by a substructure **314** (also described as a framing) defining the rough opening **312**, a finished exterior **316** on an exterior side E of the building B, and a finished interior **318** on an interior side I of the building B, according to some embodiments. FIG. **21A** shows an installation without a sill nosing material and FIG. **21B** shows an installation with a sill nosing, according to some embodiments, as subsequently described.

The pre-existing fenestration unit is optionally removed from the rough opening **312** using similar methodology to that previously described—e.g., including cutting around a perimeter of the pre-existing fenestration unit without removing a significant portion of the finished exterior **316** of the building B.

As shown in FIGS. **21A** and **21B**, the substructure **314** defines various portions of the rough opening **312**, including a sill **320**, a head **322** opposite the sill **320**, a first jamb **324** (FIG. **22**), and a second jamb (not shown) opposite the first jamb **324**. In some embodiments, the finished exterior **316** is a stucco finish (e.g., including a weather barrier, metal lath, one or more plaster layers, and/or other materials), though alternate or additional finished exteriors are contemplated (e.g., brick, tile, or other finished surfaces). The interior **318** optionally includes a layer of drywall and/or other materials (e.g., vapor barrier material). A drywall return **330** (or other material) defining an exterior edge **332** is optionally secured to the sill **320**, head **322**, the first jamb **324**, and the second jamb as desired.

As shown in FIGS. **21A** and **21B**, the replacement installation **310** includes a fenestration unit **340** and a water management system **342**. In some embodiments, the replacement installation **310** is provided as part of a method of replacing a pre-existing fenestration unit (not shown) previously installed in the rough opening **312** of the substructure **314**.

As shown in FIGS. **21A** and **21B**, the fenestration unit **340** is a door unit having a frame **360** and a flange **362**. During installation, the frame **360** is received in the rough opening **312** with the flange **362** abutting or residing adjacent portions of the finished exterior **316** and/or substructure **314**, for example. FIG. **21A** shows a door unit having the flange **362** on all four sides and FIG. **21B** shows a door unit having the flange **362** on three sides (as shown, not on the bottom end of the door unit).

The water management system **342** includes a liner system **370** and a barrier system **372**. The liner system **370** includes a sill pan **380**, a head liner **382**, a first jamb liner **384** (FIG. **31**), and a second jamb liner (not shown). In some embodiments, the head liner **382**, the first jamb liner **384**, and the second jamb liner are each formed during installation from substantially the same preformed liner material (though not necessarily the same piece of liner material), such as the segment of the liner material **100** shown in FIGS. **2A** and **2B**.

As shown in FIGS. **21A** and **21B**, the barrier system **372** includes flashing **420** to help reduce the potential for water ingress into the interior side I of the building B. The flashing **420** is optionally flashing tape, such as butyl flashing tape sold under the trade name "SMARTFLASH," by Pella Corporation of Pella, Iowa. The barrier system **472** also optionally includes various sealant layers, applied as a liquid by the installer as previously described.

As shown in FIGS. **23A-23C**, a method of replacing the existing fenestration unit (not shown), or pre-existing fenestration unit, includes using sill pan material **500** to construct the sill pan **380**. The sill pan material **500** is optionally an elongate length of material having a substantially L-shaped cross-section with the back flange **510**, or vertical leg, and a base **512**, or horizontal leg. Sill pan construction optionally includes measuring the width of the rough opening **312**, adding approximately 2" to that width to get the desired length, and cutting the sill pan material **500** to that length. The installer measures inward approximately 1" from each end of the sill pan material **500** and cuts through the back flange **510** of the pan material **500** at each end, resulting in side flaps **514** (one of which is shown in FIG. **23B**) and back legs **516** (one of which is shown in FIG. **23B**). Each of the resulting side flaps **514** are bent up and the remaining back legs **516** are bent around the side flaps **514** to form the ends of the sill pan **380**. The sill pan **380** is then test fit in the rough opening **312** to ensure the sill pan **380** is of an appropriate size.

FIG. **22** shows a portion of the rough opening **312** in the building B that has been partially prepared for installation of the replacement fenestration unit **340** (FIGS. **21A** and **21B**), according to some embodiments. As shown, gaps between the finished exterior **316** and the rough opening **320** are filled with gap sealant **518**.

As shown in FIG. **24**, a sill sealant **520** is applied (e.g., four generally parallel lines of an approximately 0.375 inch bead of sealant) across the sill **320**, where at least a part **520A** of the sill sealant **520** (e.g., one of the lines of sealant) covers the gap between the finished exterior **316** and the sill **320**. As shown in FIG. **22**, a sill corner sealant **522** (e.g., a 0.375 bead of sealant) is applied at each corner of the sill **320**. As shown in FIG. **24**, the sill pan **380** is installed on the sill **320** of the rough opening **312** and pressed down to seal the sill pan **380** to the sill **320** of the rough opening **132**.

As shown in FIG. **22**, in some embodiments, a jamb filler strip **530** is cut for the first jamb **324** and a second jamb filler strip (not shown) is cut for the second jamb and a head filler strip **532** is cut for the head **322**. In some embodiments, the filler strips are approximately 0.5 inch thick wood or expanded PVC filler strips. In some installations, the width of the various filler strips is determined by measuring a distance from the outer surface of the stucco to an exterior edge of a drywall return **540** at the first jamb **324**, second jamb, and the

head **322** and subtracting approximately 2" from that distance. In some embodiments, the filler strips **530**, **532** are placed against the edge of the drywall return **540** at the jambs and head of the rough opening **312**. The filler strips **530**, **532** are optionally installed using fastening means, such as #8×1.5 inch wood screws at 16" on center maximum spacing from one another.

As shown in FIG. **22**, similarly to the methodology previously described in association with the fenestration unit **40**, the gap sealant **518** (e.g., a 0.375 inch bead of sealant) is applied between the finished exterior **316** and the rough opening **312** at the first jamb **324** and the second jamb, leaving the gap between the finished exterior **316** and the head **322** relatively free from sealant. The gap sealant **518** is optionally tooled into the gap between the finished exterior **316** and the rough opening (e.g., with a putty knife).

In some embodiments, sill flashing **556** is applied over the finished exterior **316** and the sill pan **380** as shown in FIG. **24**. For example, two pieces of flashing tape, a first piece of flashing **556**A and a second piece of flashing **556**B, are cut **12**" longer than the width of the rough opening **312**, where the first piece **556**A is disposed across the sill pan **380** with the exterior edge of the first piece **556**A overlapping onto the finished exterior **516** approximately 1" and extending approximately 6" up each of the first jamb **524** and the second jamb. The second piece **556**B of flashing tape is applied over-lapping the first piece **556**A with the interior edge of the second piece **556**B positioned along the interior corner of the sill pan **380** and approximately 6" up each of the first jamb **524** and second jamb **526**.

In some embodiments, jamb flashing (not shown) is also applied over the finished exterior **516** and the first jamb **524** and the second jamb. For example, two pieces of flashing tape are cut equal to the height of the rough opening **312** with the exterior edge of each of the pieces of tape being placed along the exterior edge of the finished exterior **316**, the pieces of tape being pressed down over any jamb sealant, exposed substructure **314**, along the edge of the drywall return **540**, and over onto the edge of the drywall return **540**.

While the sill pan **380** is optionally applied as shown in FIG. **21**A, as shown in FIGS. **21**B, **25** and **26**, in some embodiments, a sill nosing **600** is also applied as part of the installation process (e.g., in the instance of a three-sided, flush flange sill door installation). For example, the sill nosing **600** is optionally cut to the width of the rough opening **316** plus two times the width of the flange **362** of the fenestration unit **340** (FIG. **21**B). Where the sill nosing **600** is applied, as shown in FIG. **21**B, a narrower sill pan **380** is used and the sill sealant **520** is applied across the sill **320** of the rough opening sill and finished exterior **316** (e.g., seven lines of approximately 0.375 inch beads of sealant), where it is ensured that the sill sealant **520** covers the gap between the stucco and the sill **320** of the rough opening **312** and the sill sealant **520** is applied where the sill pan **380** will sit, as well as in front of the sill pan **380** and onto the finished exterior **316** over which the sill nosing **600** will reside upon installation thereof. The sill sealant **520** is also applied at each corner of the rough opening **312** from the finished exterior **316** to the edge of the rough opening **312**, according to some embodiments. The sill pan **380** and the sill nosing **600** are then applied at the sill **320** and are pressed down into the sill sealant **520**. In some embodiments, fasteners are used to secure the sill pan **380** and sill nosing **600** in the rough opening **312**.

With the sill nosing **600**, in some embodiments, the sill flashing **556** is formed by cutting the two pieces **556**A, **556**B of flashing (e.g., flashing tape) **12**" longer than the width of the rough opening **312**, placing the first piece **556**A across the sill nosing **600** just up to where the sill nosing **600** begins to slope down and extending **6**" up each of the first jamb **324** and the second jamb, and placing the second piece **556**B overlapping the first piece **556**A and the exterior edge of the sill pan **302** and approximately 6" up of the jambs. Jamb flashing is optionally formed and applied as previously described.

Whether the sill is prepared with the sill pan **380** or with the sill pan **380** and sill nosing **600**, in some embodiments, the head **322** is prepared as shown in FIGS. **27-30**. The head liner **382** is prepared similarly to the head liner **82** (e.g., at each end of the head liner **382** a connection port is formed) and the head liner **382** is sealed to the head **322** of the rough opening **312** by applying a head sealant **610** across the head **322** of the rough opening **312**. For example, an approximately 0.375 inch bead of sealant is applied across the head **322** of the rough opening and approximately 1 inch down onto the jambs prior to installing the head liner **382**.

The head liner **382** is installed over the head sealant **610** and attached to the head **322** of the rough opening **312** (e.g., 1.25 inch self-drilling screws are placed through the head liner **6**" from each end and 12" on center). Each end of the head liner **382** is sealed to the first and second jambs, although the connection portions on the head liner **382** are not sealed. The head liner **382** is either positioned generally flush with the finished exterior **316** as shown in FIG. **29** if the finished exterior **316** is flush with the rough opening **312** or is overlapped over the finished exterior **316** as shown in FIG. **30** if the finished exterior **316** is not flush (e.g., projects beyond) the rough opening **312** at the head **322**.

In some embodiments, a jamb sealant is applied along the each of the jambs prior to installing the first jamb liner **384** as shown in FIG. **31**, and the second jamb liner. The first jamb liner **384** and second jamb liner are optionally formed by cutting the liner material **100** to approximately 0.5 inch less than the height of the rough opening **312** and notching the first flange **108** to form exterior openings **384**A adjacent the sill **320**. The first jamb liner **384** and second jamb liner are optionally secured to the first and second jambs, respectively, using fasteners such as those previously described, where the first base **102** of each of the jamb liners faces toward a center of the rough opening and the second base **112** of each of the jamb liners is secured to the respective jamb (e.g., using fasteners such as those previously described). The channels **114** of each of the jamb liners are aligned to the connection ports on the head liner **382** such that water flowing in the head liner **382** runs down into the first jamb liner **384** and second jamb liner and out of the exterior openings **384**A in the jamb liners.

A final sealant is optionally applied, where the first jamb liner **384** and the second jamb liner are sealed to the first jamb **324** and the second jamb, respectively. In some embodiments, sealant is applied completely across the tops of the jamb liners, where the jamb liners meet the head liner **382**. The entire inside edge of the sill liner **380** is optionally sealed to the sill nosing **600** or the sill pan **380** as appropriate. A final check is made to ensure that water is able to exit from the exterior notches in each of the jamb liners. Any liner splices are covered with flashing tape and the fenestration unit installation is then completed by installing the fenestration unit **340** (FIGS. **21**A and **21**B) in the prepared rough opening **312**.

The foregoing embodiments provide an effective and efficient means for installing a replacement fenestration unit in an application where the existing fenestration unit is removed from the corresponding structure by cutting around a perimeter of the existing fenestration unit (e.g., rather than removing substantial portions of the finished exterior, such as a stucco finish, of the structure). Various modifications and additions can be made to the exemplary embodiments dis-

cussed without departing from the scope of the present invention. For example, while the embodiments described above refer to particular features, the scope of this invention also includes embodiments having different combinations of features and embodiments that do not include all of the described features. Accordingly, the scope of the present invention is intended to embrace all such alternatives, modifications, and variations as fall within the scope of the claims, together with all equivalents thereof.

We claim:

1. A water management system for installation in a frame including a first jamb member, a second jamb member, a head member, and a sill member, the first and second jamb members, the head member, and the sill member defining a rough opening in a building structure having an exterior side and an interior side, the system comprising:

a sill liner adjacent the sill member of the rough opening and including a sill liner channel that faces upward toward the rough opening;

a head liner adjacent the head member of the rough opening and including a head liner channel faces upward away from the rough opening, the head liner including first and second connection ports at each end of the head liner channel;

a first jamb liner adjacent the first jamb member of the rough opening and including a first jamb liner channel aligned with the sill liner channel and the first connection port of the head liner channel such that fluid can flow from the head liner channel to the first jamb liner channel via the first connection port and from the first jamb liner channel to the sill liner channel; and

a second jamb liner adjacent the second jamb member of the rough opening and including a second jamb liner channel aligned with the sill liner channel and the second connection port of the head liner channel such that fluid can flow from the head liner channel to the second jamb liner channel via the second connection port and from the second jamb liner channel to the sill liner channel.

2. The system of claim **1**, wherein the first jamb liner defines an upper end and a lower end and the head liner defines a first lateral end and a second lateral end, the first lateral end of the head liner being engaged with the upper end of the first jamb liner.

3. The system of claim **1**, wherein the head liner has a cross-section that is substantially the same as a cross-section of the first jamb liner, the head liner including a first landing extending between a first end and a second end, a first wall extending from the first end of the first landing and a second wall extending from the second end of the first landing, the head liner channel defined between the first and second walls, and a second landing extending from the second wall, the first and second landings being vertically offset from one another.

4. The system of claim **3**, wherein the first connection port is formed into the first landing at the first lateral end of the head liner.

5. The system of claim **1**, wherein the first jamb liner defines an upper end and a lower end and the first jamb liner has a slot formed into the first wall at the lower end of the jamb liner.

6. The system of claim **1**, wherein the sill liner has a cross-section substantially the same as the cross-section of the jamb liner, and includes a first landing extending between a first end and a second end, a first wall extending from the first end of the first landing and a second wall extending from the second end of the first landing, the sill liner channel defined between the first and second walls, and a second landing extending from the second wall, the first and second landings being vertically offset from one another.

7. The system of claim **6**, further comprising a removable spacer disposed in the channel in the sill liner.

8. The system of claim **6**, wherein the sill liner includes a drainage port formed into the first wall of the sill liner, the sill liner being configured such that water in the channel in the sill liner flows from the drainage port of the sill liner.

9. The system of claim **6**, wherein the first jamb liner defines an upper end and a lower end and the lower end of the first jamb liner is engaged with the first landing of the sill unit.

10. The system of claim **1**, wherein the system is installed in a building having a finished exterior including stucco material.

11. The system of claim **10**, wherein the system is installed in the building with sealant between the stucco material and the jamb liner.

12. The system of claim **11**, wherein the system is installed in the building with the stucco material and the head liner defining an open gap therebetween.

13. A water management system for installation in a frame including a first jamb member, a second jamb member, a head member, and a sill member, the first and second jamb members, the head member, and the sill member defining a rough opening in a building structure having an exterior side and an interior side, the system comprising:

a sill liner configured to be positioned adjacent the sill member of the rough opening and including a sill liner channel that faces upward toward the rough opening;

a head liner having first and second ends and configured to be positioned adjacent the head member of the rough opening, the head liner including a head liner channel configured to face upward away from the rough opening, the head liner including a first connection port formed into the first end of the head liner and a second connection portion formed into the second end of the head liner;

a first jamb liner configured to be positioned adjacent the first jamb member of the rough opening and including a first jamb liner channel configured to be aligned with the sill liner channel and the first connection port of the head liner channel such that fluid can flow from the head liner channel to the first jamb liner channel via the first connection port and from the first jamb liner channel to the sill liner channel; and

a second jamb liner configured to be positioned adjacent the second jamb member of the rough opening and including a second jamb liner channel configured to be aligned with the sill liner channel and the second connection port of the head liner channel such that fluid can flow from the head liner channel to the second jamb liner channel via the second connection port and from the second jamb liner channel to the sill liner channel.

14. A water management system for installation in a rough opening in a building structure, the system comprising:

a sill liner configured to be positioned adjacent a sill of the rough opening and including a sill liner channel that faces upward toward the rough opening;

a head liner having first and second ends and configured to be positioned adjacent a head member of the rough opening, the head liner including a head liner channel configured to face upward away from the rough opening, the head liner including a first connection port formed into the first end of the head liner and a second connection portion formed into the second end of the head liner;

a first jamb liner configured to be positioned adjacent a first jamb member of the rough opening and including a first jamb liner channel configured to be aligned with the sill

liner channel and the first connection port of the head liner channel such that fluid can flow from the head liner channel to the first jamb liner channel via the first connection port and from the first jamb liner channel to the sill liner channel; and

a second jamb liner configured to be positioned adjacent a second jamb member of the rough opening and including a second jamb liner channel configured to be aligned with the sill liner channel and the second connection port of the head liner channel such that fluid can flow from the head liner channel to the second jamb liner channel via the second connection port and from the second jamb liner channel to the sill liner channel.

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